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ABSTRACT

This module on antineoplastic drugs is intended for use in inservice or continuing education programs for persons who administer medications in long-term care facilities. Instructor information, including teaching suggestions, and a listing of recommended audiovisual materials and their sources appear first. The module goal and objectives are then provided. A brief discussion follows of cancer, including what cancer is, how it spreads, how antineoplastic drugs affect the growth of cancer cells, and the side effects of these drugs; pain control; and considerations and suggestions for patient care. This discussion is intended for use as a lecture or participant reading. Other contents include a vocabulary list, a worksheet, and medication charts, all of which are suitable for reproduction for use as handouts. (YLB)

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ANTINEOPLASTIC DRUGS

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Antineoplastic Drugs

Instructor Information

This module includes a brief discussion of cancer—what cancer is, how it spreads and how antineoplastic drugs affect the growth of cancer cells and the side effects of these drugs. There are medication charts which show examples of several commonly used drugs from each group. These charts can be duplicated for the participant. Suggestions for care of the cancer patient on chemotherapy are included. The worksheet can be duplicated and used for discussion purposes. The vocabulary words could be written on a blackboard or large sheet of paper.

Audio Visual Materials

The following materials are available on loan from Vocational Education Services:

Cancer Studies—A Basic Overview (AV070012)
Antibiotics (AV070032)

Antineoplastic Drugs

Goal

One of the problems with Antineoplastic drugs for the treatment of cancer is that they have the tendency to destroy healthy cells as well as diseased cells. The person who administers these medications must understand their actions and adverse effects, as well as recognize the beneficial effects of antineoplastic agents. Accurate administration and observation will enable the physician to monitor the dosage of the drug according to the response of the patient.

Objectives

After completing this module, the participant will

- Differentiate the characteristics of a malignant and benign tumor
- Name 1 drug from each of the 4 groups of antineoplastic agents
- Briefly describe how antineoplastic drugs act on cancer cells
- Describe the adverse and side effects of these drugs
- Discuss possible solutions to class activity problems
- Define vocabulary by matching definitions

Cancer

Cancer—What is it?

The body is composed of tiny structured units called cells. Normal body cells grow and reproduce in an orderly fashion. Cells of one tissue type do not change into cells of another tissue type. Muscle cells do not grow into bone cells. Cells that make up our organs such as the stomach, lungs, and liver, do not invade or grow into muscles. When old cells die, new ones are reproduced in an orderly controlled manner.

Sometimes cells begin to reproduce or multiply in a wild or disorganized manner. They may do this very rapidly, outgrowing their blood supply. In their relentless search for food, they invade other organs or tissues and destroy their ability to function. These cells which have the ability to spread to other sites or areas in the body and invade or "eat up" other tissue are called "malignant" or cancerous cells.

A benign tumor or growth has cells that are fairly normal in appearance and grow rapidly. Benign tumors do not have the ability to invade other tissue, but must be removed sometimes due to their size or pressure upon other structures.

How Does Cancer Spread?

The transfer of diseased cells from one part of the body or organ to another is called metastasis.

- Malignant cells can be transfered from one part of the body to another by invading other tissues surrounding the primary site.
- Malignant cells can enter the blood and be carried to other body parts.
- Malignant cells can enter the lymph system and be trapped in the lymph nodes or transferred to other parts of the body.

Cancer can affect any part of the body.

Chemotherapy

Drug treatment of cancer is called chemotherapy. Drugs *can* cure certain types of cancer, but are used more often to control the *spread* or metastasis of cancerous cells. Antineoplastic drugs is a term often used for chemotherapeutic agents.

Actions of Specific Groups of Antineoplastic (against tumor) Drugs

Alkylating agents—slow down the cell division of malignant cells as well as normal cells.
Antimetabolites—interfere with the ability of the cells to use food for energy.
Steroids—alter normal hormonal balance to control specific cancers in the sex organs and destroy the formation of malignant cells in the lymph system.
Antibiotics—stop the growth of some cancer cells.

General Effects of Drugs Used to Treat Cancer

- May produce a remission (disappearance of symptoms) of the tumor or slow down the process of metastasis
- May slow down the appearance of secondary growths
- May relieve pain and other symptoms for a while
- May improve the quality of surviving years
- Many chemotherapeutic drugs have unpleasant and sometimes dangerous side effects

Side Effects of Antineoplastic Drugs

Antineoplastic drugs irritate the entire gastrointestinal tract. Patients should be observed carefully for nausea and vomiting, irritation of the mouth and mucus membranes and bleeding around the gums or in the stool. Some drugs have a toxic effect on the blood forming organs causing *thrombocytopenia* (decrease in platelets causing bruising and bleeding tendencies) and leukopenia (decreased white blood cell count). *Leukopenia* lowers the patient's resistance to infection.

The skin may bruise easily, exhibit itching, rashes, ulcerations, and abscesses. The patient may develop *alopecia*(hair loss).

Pain Control

General Discussion

Pain caused by advanced stages of cancer tends to be chronic and unrelenting. The type of drug the physician may choose to relieve pain in the advanced cancer patient may differ from that used with a patient whose pain occurrence is intermittent and lasts for only a short period of time.

Pain is a physiological as well as an emotional response to an unpleasant stimuli.

Analgesics

Non-synthetic Narcotic Analgesics
Definition—"analgesics" are drugs used to relieve pain; "narcotic" originates from the Greek word "narco" which means numbness or deadening; non-synthetic narcotics are derived from opium.

Examples of Non-synthetic Narcotics:

Morphine, Codeine } act on central nervous system—alter emotional response to pain

Papaverone, Dehydromorphinone HCL (Dilaudid) } produce relaxation of smooth muscle

Synthetic Narcotic Analgesics
Definition—chemicals discovered during the search for a drug which resembled morphine, yet would not have addiction potential.

Examples of Synthetic Narcotics

meperidine HCL—Demerol
methadone HCL—Dolophine
anileridine—Leritine
} depress chemical receptors to interrupt pain impulse

Combination Products (Bromptom's Mixture)
Definition—Bromptom's mixture is a combination of narcotics prepared individually for the patient with severe chronic pain in the terminal stages of cancer.

Drugs used in Bromptom's mixture—(Bromptom's cocktail) contains
morphine or methadone
cocaine
elixer (alcohol or honey)
optional antiemetic

Side Effects of Synthetic and Narcotic Analgesics

- Nausea/vomiting
- Constipation
- Urinary retention
- Depression of respiratory center in brain
- Depression of cough reflex
- Increased restlessness, tremors, confusion
- Skin rash, activation of asthma
- "Itchy" nose
- Dependence
- Tolerance addiction
- Cardiac arrythmias in synthetic narcotics

Role of the Person Administering Narcotics to the patient with terminal cancer

- When charting, describe type of pain (sharp, stabbing, dull, etc.), location, when it began and what factors influenced intensity (cough, moving)
- Medication should be administered as soon as possible upon request as anxiety can lessen the effects of a narcotic
- Observe patient for adverse or side effects
- Place siderails "up" after administration of a narcotic
- Give medication regularly if needed to lower anxiety level and provide comfort
- Observe for relief of pain
- Observe for respiratory depression—withhold medication if respiration is below 12 per minute—contact physician
- Narcotics are controlled substances—they must be kept double locked and accounted for
- If Brompton's mixture has cocaine, advise patient to swish around in mouth to aid absorption

Providing for the Physical Comfort of the Terminally Ill Patient

- Observe the patient with metastasis for complications such as hemorrhage, infection, and fractures
- To provide for ventilation and circulation, turn patient every two hours
- Maintain skin condition by frequent skin care and observation for reddened or broken areas on bony prominences
- Provide support for patient by placing pillows to back, while patient is lying on side
- A small pillow or folded soft blanket can be placed between knees to avoid pressures
- Air-mattresses, flotation pads, or sheepskins can be placed under patient to reduce pressure areas
- Patient may tolerate small frequent feedings rather than meals
- Assist patient in moving and ambulating to promote activity as long as possible
- Control odors in patient's environment by using aerosol deodorants and changing dressings and soiled linen when necessary
- Mouth care using non-abrasive toothbrush will prevent bacteria from collecting in mouth and soothe oral mucosa

Providing for the Emotional Support of the Terminally Ill Patient

- Provide patient with your time to enable him/her to verbalize feelings
- Talk to patient in terms of hour to hour or day by day activities—avoid month by month or year by year activities
- Reassure patient and offer support, but avoid "empty" reassurances such as "you'll probably be going home soon"
- Accept patient's anger, avoid reacting personally
- Utilize services of chaplain, minister, priest, or rabbi, when requested
- Reassure patient that appropriate drugs will be given to alleviate pain
- Demonstrate interest and concern for the family members
- Try to assign same personnel to dying patient

Considerations for Care

Responsibilities	Suggestions
Recognize withdrawal behavior in patient. Hair loss may result in depression and loss of social contacts.	Hair-pieces are available for men and women. An attractive head scarf may help the patient feel more comfortable. Listen to patient's fears and needs. Provide emotional support.
Help patient to maintain nutrition although patient may have nausea, vomiting, or soreness of mouth and tongue.	Check temperature of food; insure that it is neither too hot nor too cold. Avoid highly seasoned foods. Soft toothbrushes will cause less trauma to the mouth and gums. Smoking and alcohol irritate the membranes of the mouth.
Recognize signs of toxicity.	Avoid suggesting side effects to patient. Minor side effects can be relieved by routine drugs for pain and nausea.
Observe closely for signs of infection.	Protect patient from germs. Resistance to infection is low, and natural defenses are weakened by chemotherapy. Isolation is sometimes required. Observe patient for chills, fever, cough, sore throat, and weakness.
Protect patient's skin from bruising and bleeding.	Side effects of chemotherapeutic drugs often cause the patient to bruise or bleed easily. Precautions to prevent this from occurring would be: padding siderails; caution when removing adhesive tape—or changing dressings; shaving male patients with electric razor; being extremely gentle when changing patient's position in bed.

Responsibilities	Suggestions
Observe patient for beneficial effects of chemotherapy.	Beneficial effects of chemotherapy include: relief of pain; improved appetite; weight gain.

Increase your word power by learning these terms.

infection—growth of microorganisms in the tissue which produces symptoms like chills, fever, pain, redness and swelling
tumor—a mass of abnormal tissue
malignant tumor—one which invades other tissues and grows in a wild disorganized way. Malignant tumors metastasize
benign tumor—one which does not invade other tissues; does not metastasize
metastasis—transfer of a disease from one part of the body to another through the blood stream or lymphatic system. Malignant tumors metastasize
chemotherapy—treatment by use of chemicals (medications)
antineoplastic—a drug which acts against cancer
stomatitis—inflammation of the mouth
alopecia—baldness

Worksheet

Class Activity—Discussion

Mrs. Peeples returned to the nursing home 3 weeks after explorative abdominal surgery. She had undergone surgery for cancer of the breast 10 years ago, and had had no apparent problems until she developed abdominal cramping and diarrhea. The surgeon discovered a large tumor in her abdomen with metastasis to the lymph nodes. Mrs. Peeples' physician has ordered chemotherapy. She is receiving methotrexate (Mexate) p.o. daily.

1. The surgical report stated Mrs. Peeples' tumor had metastasized to the lymph nodes. From the surgeon's report, we can assume that her tumor is:
   a. malignant
   b. benign
   c. localized
   d. encapsulated

2. After several weeks of therapy, Mrs. Peeples begins to lose her hair. What might you suggest that would be beneficial to Mrs. Peeples:
   a. that her family not embarass her by visiting so often
   b offer Mrs. Peeples a private room
   c. show her other patients who have lost their hair
   d. suggest buying a wig

3. Mrs. Peeples' blood test results have shown that her white blood count is extremely low. You would expect:
   a. an increase in the amount of medication
   b. a recurrence of diarrhea
   c. a decreased resistance to infection
   d. the medication is ineffective

4. Other chemotherapeutic drugs used to treat cancer are:
   a. antihistamines
   b. antibiotics
   c. antidepressants
   d. antiseptics

5. Mrs. Peeples is receiving Mexate for management of her disease. What adverse or side effects would you be looking for:

1.	2.	3.
4.	5.	6.

6. List four suggestions that could protect the patient who bleeds or bruises easily from chemotherapeautic medications:
   1. 2.
   3. 4

7. An extremely low white blood cell count is called:
   a. thrombocytopenia
   b. platelets
   c. leukopenia
   d. anemia

8. Mrs. Peeples developed nausea and vomiting. The nausea and vomiting is probably caused by:
   a. disease in her abdomen due to cancer
   b. irritation of the gastrointestinal tract caused by the medication
   c. not eating properly
   d. an infection

9. A condition in which platelets in the blood are destroyed and the patient bruises and bleeds easily is called:
   a. leukopenia
   b. anemia
   c. thrombocytopenia
   d. infection

10. Matching—Place the correct number from Column B into the blank in Column A. There is only one correct answer for each definition.

A	B
_____ infection	1. cells do not invade healthy tissue
_____ malignant	2. inflammation of tongue and mouth
_____ tumor	3. against tumor
_____ benign	4. cells invade healthy tissue
_____ chemotherapy	5. terminal disease
_____ antineoplastic	6. chills, fever, sore throat, cough
_____ stomatitis	7. a mass of abnormal tissue
_____ alopecia	8. drug treatment of cancer
_____ metastasize	9. loss of hair
	10. transfer of disease through the blood stream in lymph system

Antineoplastic Agents

Drug	Side Effects	Interacts With	To Produce	Remember
Alkylating Agents				
Cyclophosphamide Cytoxan Procytox	Anemia Anorexia Nausea Vomiting Hair loss Bladder problems Sore tongue and mouth	**Corticosteroids** **Chloramphenicol**	Decreased effect of drug	Give excellent mouth care to prevent sore mouth and tongue.
		Allopurinol	Increased effect of drug	Encourage fluids to prevent bladder infections.
Antimetabolites				
Fluorouracil Adrueil 5 FU	Anemia Eye irritation Watering Blurred vision Light hurts eyes Nausea/vomiting Diarrhea Skin irritations Hair loss Weakness Malaise Chest pain	None	None	Given orally in orange juice; watch skin for easy bruising; should use sun screen lotions to avoid skin problems if patient is exposed. Observe patient for chest pain; because resistance is lowered, patient may require reverse isolation.

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Antineoplastic Agents

Drug	Side Effects	Interacts With	To Produce	Remember
Methotrexate Mexate	Anemia Leukopenia Thrombocytopenia Stomatitis Diarrhea Blood in stools Dermatitis Hair loss Pulmonary bleeding	**Alcohol**	Increased liver damage	Don't give cough syrups that contain alcohol.
		Probenacid Benemid Benn Benuryl Probalon Probenimead Robenecid	Increased Mexate toxicity	Watch for GI bleeding, cough, difficult breathing, cyonosis, skin rash, redness or sores in mouth. Use sun screen when patient is exposed to sun.
		Phenylbutazone Algoverine Anevral Azolid Butagesic Butazolidin Intrabutazone Neo-Zoline Phenbutazone Phenylbetazone		
		Salicylates Aspirin ASA Empirin Bufferin Ascriptin Alka-Seltzer	Increased methotrexate toxicity.	
		(continued below)		

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Antineoplastic Agents

Drug	Side Effects	Interacts With	To Produce	Remember
Methotrexate Mexate	Anemia Leukopenia Thrombocytopenia Stomatitis Diarrhea Blood in stools Dermatitis Hair loss Pulmonary bleeding	**Sulfonamides** Sulfisoxazole (Gantrisin) Sulfamethoxazol (Gantanol) Sulfasalazine (Azulfidine) **Multiple sulfas** Sulfonomides Duplex Triple Sulfa Neotrizine Quadettes Sulfaloid Terfonyl Trisem Thoisul Tri Sulfa #2 Gelazine Quad Ramoid Sulfaloid Sal-Trio Trisureid	Increased methotrexate toxicity	Don't give cough syrups that contain alcohol. Watch for GI bleeding, cough, difficult breathing, cyonosis, skin rash, redness or sores in mouth. Use sun screen when patient is exposed to sun.

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Antineoplastic Agents

Drug	Side Effects	Interacts With	To Produce	Remember
Steroids				
Testolactone Teslac	Possible increase in B/P Edema of the extremities Sore tongue Anorexia Nausea/vomiting	None	None	
Tamoxiphen citrate Nolvadex	Nausea/vomiting Vaginal bleeding	None	None	May cause temporary bone or tumor pain.
Calusterone Methosarb	Nausea/vomiting Secondary male sexual characteristics in females Facial hair Deepening of voice Loss of hair	None	None	Given for breast cancer.
Megestrol acetate Megace	None	None	None	Given for breast cancer.
Diethylstilbesterol DES	Headache Phlebitis hypertension Stroke Worsening of myopia Nausea/vomiting Excessive thirst	None	None	Given for Ca Prostate.

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Antineoplastic Agents

Drug	Side Effects	Interacts With	To Produce	Remember
Antibiotics				
Procarbazine HCL Matulane Natulan	Anemia Headache Dizziness Loss of feeling Insomnia Nightmares Hallucinations Coma Seizures Hair loss CHF Eye problems Nausea/vomiting Diarrhea Constipation Edema Skin problems	Alcohol	Nausea/vomiting	Warn patient not to use cough syrups, mouthwashes that contain alcohol. Observe closely for side effects.

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Non-Synthetic Narcotics

Drug	Side Effects	Interacts With	To Produce	Remember
Morphine sulfate **Codiene** Sulfate **Hydromorphone** Dilaudid **Papaverine**	Drowsiness Sedation euphoria Restlessness Convulsions Orthostatic hypotension Urinary retention Urgency Skin rash Nausea/vomiting Constipation Tolerance Dependence Respiratory depression	Tranquilizers Sedatives Hypnotics Alcohol Tricyclic antidepressants MAO inhibitors	Respiratory depression Profound sedation coma	Use with caution in patients with head injury, COPD, seizures, asthma, and in elderly and debilitated patients. Do not give if respirations below 12.

Synthetic Narcotic Analgesics

Merperidine HCL Demerol	Drowsiness Sedation euphoria Restlessness Convulsions Orthostatic hypotension Urinary retention Urgency Skin rash Nausea/vomiting Constipation Tolerance Dependence Respiratory depression	As above plus MAO inhibitors	Increased CNS excitation or depression can be fatal	Not given if patient has had MAO inhibitors in last 2 weeks. Syrup has local effect, will anesthetize throat—give with glass of water. Use with caution in patients with head injury, asthma, COPD, seizures, and in elderly and debilitated patients. Do not give if respirations below 12.
Methadone Dolophine		Same plus **Pentazocine** **Rifampim** **Butorphenol** **Ammonium chloride** **Phenytoin**	Withdrawal symptoms May reduce methadone effect	
Anileridene Leritine		Same as morphine	Depressant effect increased	

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